

PATENT

Attorney Docket No. A-71183/DJB/VEJ
Attorney Matter No. 461124-00077
Application No. 10/009,325

REMARKS

Reconsideration of this Application is respectfully requested. Upon entry of the foregoing amendments, claims 1-13 are pending in the application, with claims 1 and 13 being the independent claims. Support for the subject matter of the amended claims is contained in the application as originally filed. Because the foregoing changes introduce no new matter, their entry is respectfully requested.

Based on the above Amendment and the following Remarks, Applicant respectfully requests that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Claim Suggestions and Objections

The Examiner made suggestions and objections to claims 7 and 11, respectively. Applicant respectfully submits that claim 7 has been amended in accordance with the Examiner's suggestion and that the objection of claim 11 is overcome by the accompanying amendment thereto.

Claims 1, 2 and 7 have been amended to correct inadvertent typographical and clerical errors introduced by the Third Preliminary Amendment filed October 15, 2003.

Rejections under 35 U.S.C. § 102***Claims 1-3 and 8-11***

The Examiner has rejected claims 1-3 and 8-11 under 35 U.S.C. § 102 as being anticipated by Japanese Patent No. 63-236267 to Kodama et al. ("the Kodama patent"). The Kodama patent lacks the solid oxide fuel cell system component of the present invention, as called for by independent claim 1.

While the broad composition range disclosed in the Kodama patent may overlap with the composition range of claim 1, the Kodama patent fails to disclose the narrow

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claimed composition with "sufficient specificity to constitute an anticipation". See *M.P.E.P.* § 2131.05. Furthermore, the Kodama patent fails to teach or suggest, much less disclose using the composition for a component of a solid oxide fuel cell system.

It is particularly important to note that none of the examples (or the comparative examples) in Table I in the Kodama patent read onto the compositions in any of the claims in the present application. A major reason for this is the different aims of the compositions in the Kodama patent and the present application arising from the different systems in which they are used.

In particular, the aim of the solid oxide fuel cell component of the present invention is that it is capable of forming a stable Al_2O_3 layer on the surface of the component when exposed to an oxidising atmosphere at a highly elevated temperature. See page 4, line 14 *et seq.* For this purpose, the component must contain a minimum of 5 wt% Al and no more than 5 wt% Cr, preferably no more than 0.1 wt% Cr, and more preferably no Cr.

Example 1 alone in the Kodama patent does have Al and Cr amounts within the ranges defined by claim 1, but it has excessive Ni and Si. According to the Kodama patent, Ni and/or Co are added at *high* levels in order to enhance the adhesion of the oxidation film to the substrate, with no significant effect being observed if less than 0.5 wt% Ni and/or Co is present. In accordance with the present invention, no more than 0.61 wt% Ni can be present in the composition and no Co is allowed for. It has been found with the present invention composition that Ni at higher levels is not necessary to form the tight, adherent alumina layer on the surface of the component within the defined limits of Al and Cr. Also according to the Kodama patent, Si is required to stabilize the grain boundaries at the surface of the materials at the gas-liquid boundary in a fused carbonate environment. Bearing in mind the component of the present invention is for a solid oxide fuel cell system, such high levels of Si have not been found to be necessary and a preferred maximum Si content is 1.5 wt% to avoid difficulties in processing the composition.

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In all of the other examples in Table 1 of the Kodama patent, the Cr levels are above, and in some cases well above, the maximum of 5 wt% required by the present invention. A major reason the Kodama patent teaches such Cr levels is for the Cr to form a corrosion-resistant lithium chromate coating in a fused carbonate fuel cell environment comprising Li_2CO_3 and K_2CO_3 . Similarly, the Al present in the composition for the fused carbonate type fuel cell in the Kodama patent is desired to form a lithium aluminate film that has excellent resistance to corrosion in the lithium-containing fused carbonate environment.

As noted above, and in contrast to the requirement in the Kodama patent to form lithium chromate and lithium aluminate films on the surface of the component, *the whole point of the present invention is to avoid having chromium at the surface of the solid oxide fuel cell component at all, by forming a stable Al_2O_3 layer on the surface of the component.* The narrower ranges of the present invention provide an unexpected result, namely, *Al_2O_3 layer on the surface of the component* which avoids having chromium at the surface of the component, which result is clearly not contemplated by the Kodama patent. *See M.P.E.P. § 2131.05.*

For at least these reasons, Applicant respectfully submits that the Kodama patent does not anticipate presently amended claim 1. Applicant submits that claims 2, 3 and 8-11, which depend from claim 1, are allowable over the cited art for at least the same reason noted above.

Rejections under 35 U.S.C. § 103

Claims 1-11

The Examiner has rejected claims 1-11 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 6,296,962 to Minh ("the Minh patent") in view of U.S. Patent No. 3,811,874 to Caule et al. ("the Caule patent"). The Minh patent and the Caule patent, taken individually or combined, fail to disclose or suggest the claimed solid oxide fuel cell component, as is called for by independent claim 1.

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The Examiner has taken the position that the Minh patent is directed to a solid oxide fuel cell comprising an interconnect or bipolar/separator plate which is made of a heat and oxidation resistant alloy, and that it would be obvious to modify the composition of the interconnect plate in light of the alloy composition broadly disclosed by the Caule patent.

While the broad composition range disclosed by the Caule patent may overlap with the composition range of claim 1, the Caule patent, like the Kodama patent above, fails to disclose the narrow claimed composition with "sufficient specificity to constitute an anticipation". See *M.P.E.P.* § 2131.05.

Although the disclosure of the Caule patent at column 1, lines 54 to 61 is as stated by the Examiner, according to the claims of the Caule patent, this reference is directed to an iron base alloy consisting essentially of (A) an element in an amount from 1 to 7% selected from the group consisting of beryllium, aluminum, indium and gallium and (B) germanium in an amount of from 1 to 4%. Thus, aluminum is not essential to the composition and, when present, only overlaps in the range 5 to 7 wt%, and, in contrast to the present invention, silicon is not present at all and germanium must be present.

Not surprisingly in view of the above, like the Kodama patent, none of the Examples in the Caule patent fall within the composition range of the claims of the application. Only some of the examples in the Caule patent are directed to an aluminum/silicon composition, but these have an Al content of 3 wt%, well below the claimed range. As noted above, a minimum of 5 wt% Al is considered necessary in the component of the invention in order to form the desired alumina layer when subjected to the heat treatment.

Furthermore, although the Minh patent does disclose oxidation resistant metal interconnects/separators for solid oxide fuel cell systems, the Minh patent in fact teaches away from the present invention in that the only examples of materials for those components are nickel *chromium* and iron *chromium*. See column 4, lines 14-16. These materials will suffer exactly the problems with chromium discussed in the present application. Furthermore, since the whole point of the alloy composition in the Caule patent is to avoid

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the formation of adherent chromium oxide surface layers, it would seem to be highly unlikely that the skilled artisan would combine the disclosures of the Caule patent and the Minh patent to achieve the invention. *See, e.g., M.P.E.P.* § 2145 X.D.2. ("It is improper to combine references where the references teach away from their combination").

For at least these reasons, Applicant respectfully submits that the Minh patent and Caule patent do not render presently amended claim 1 obvious. Applicant submits that claims 2-11, which depend from claim 1, are allowable over the cited art for at least the same reasons noted above.

It is noted that Applicant respectfully traverses the Examiner's rejection of claim 7 based on the grounds that the thickness of aluminum oxide film is a parameter which may be manipulated by the skilled artisan. Should the Examiner maintain this rejection, Applicant respectfully requests citation of a reference in support of the Examiner's position. *See M.P.E.P.* § 2144.03.

Applicant also respectfully traverses the Examiner's rejection of claim 8 based on the grounds that the "scrap metal" does not have to be accorded patentable weight. Should the Examiner maintain this rejection, Applicant respectfully requests citation of authority in support of the Examiner's position. *See M.P.E.P.* § 2144.03.

Other Matters

Applicant respectfully submits that new claim 13 is allowable over the cited art of record. New claim 13 calls for a solid oxide fuel cell system including a fuel cell system component identical to that set forth in claim 1. Accordingly, Applicant respectfully submits that claim 13 is allowable over the cited art of record for at least the same reasons as claim 1 noted above.

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CONCLUSION

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

The Commissioner is hereby authorized to charge any underpayment of fees associated with this communication, including any necessary fees for extension of time or additional claims, and/or credit any overpayment to Deposit Account No. 50-2319 (Order No. 461124-00077; Docket No. A-71183/DJB/VEJ).

Prompt and favorable consideration of this Amendment and Response is respectfully requested.

Respectfully submitted,

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